

Refine Search

10/7/98

Search Results -

Terms	Documents
L5 and ((faster or fast or accelerat? or speed? or quick) near3 (growth))	2

Database:

US Pre-Grant Publication Full-Text Database

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IBM Technical Disclosure Bulletins

Search:

L8

Refine Search

Recall Text

Clear

Interrupt

Search History

DATE: Wednesday, July 20, 2005 [Printable Copy](#) [Create Case](#)

Set
Name
side by
side

Query

Hit
Count

Set
Name
result set

DB=PGPB; PLUR=YES; OP=ADJ

<u>L8</u>	L5 and ((faster or fast or accelerat? or speed? or quick) near3 (growth))	2	<u>L8</u>
<u>L7</u>	l5 and current near4 (opposite)	0	<u>L7</u>
<u>L6</u>	L5 and ((faster or fast or accelerat? or speed? or quick) near (growth))	1	<u>L6</u>
<u>L5</u>	(electroplat?) and brightener	51	<u>L5</u>
<u>L4</u>	pgpubs	1	<u>L4</u>

DB=USPT; PLUR=YES; OP=ADJ

<u>L3</u>	(438)![CCLS]	0	<u>L3</u>
<u>L2</u>	(pgpubs)![CCLS]	0	<u>L2</u>
<u>L1</u>	pgpubs	41	<u>L1</u>

END OF SEARCH HISTORY

Hit List

Clear

Generate Collection

Print

Fwd Refs

Bkwd Refs

Generate OACS

Search Results - Record(s) 1 through 2 of 2 returned.

☐ 1. Document ID: US 20040256239 A1

L8: Entry 1 of 2

File: PGPB

Dec 23, 2004

PGPUB-DOCUMENT-NUMBER: 20040256239

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040256239 A1

TITLE: Tin plating method

PUBLICATION-DATE: December 23, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Whitlaw, Keith L.	Buxton	NY	GB	
Toben, Michael P.	Smithtown		US	
Egli, Andre	Richterswil		CH	
Crosby, Jeffrey N.	Nuneaton		GB	
Robinson, Craig S.	Coventry		GB	

US-CL-CURRENT: 205/118; 427/282

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	EMAC	Drawings
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☐ 2. Document ID: US 20040084318 A1

L8: Entry 2 of 2

File: PGPB

May 6, 2004

PGPUB-DOCUMENT-NUMBER: 20040084318

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040084318 A1

TITLE: Methods and apparatus for activating openings and for jets plating

PUBLICATION-DATE: May 6, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Cohen, Uri	Palo Alto	CA	US	

US-CL-CURRENT: 205/98

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	EMC	Draw D.
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Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs	Generate OACS
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Terms	Documents
L5 and ((faster or fast or accelerat? or speed? or quick) near3 (growth))	2

Display Format:

[Previous Page](#)

[Next Page](#)

[Go to Doc#](#)

[First Hit](#)[Previous Doc](#)[Next Doc](#)[Go to Doc#](#)[Generate Collection](#)[Print](#)

L8: Entry 1 of 2

File: PGPB

Dec 23, 2004

DOCUMENT-IDENTIFIER: US 20040256239 A1

TITLE: Tin plating method

Summary of Invention Paragraph:

[0007] A suitable coating for such metal lead frames is tin or a tin alloy. However, tin or a tin alloy plated on the lead frame may form whiskers. Whisker formation is especially noticeable at points of stress and strain in the lead frames. Early literature (see S. C. Britton, Trans. Inst. Metal Finishings, 52, 95 (1974)) alleged that copper undercoats may reduce tin whiskering, however, recent studies (see Keith Whitlaw & Jeff Crosby, Proceedings--AESF SUR/FIN Annual International Technical conference, (2002) have clearly shown that copper undercoats may accelerate whisker growth substantially. In some cases tin or tin alloy deposits, which exhibit low tendency to formation of whiskers in the absence of copper undercoat, may rapidly produce high population densities of long tin whiskers when a copper undercoat is applied to a substrate. Workers in the art attribute whisker formation due to copper underlayers to copper crystal orientation of predominantly 111 (Miller Index). Predominantly means that 60% or greater of the copper crystal orientation at the deposit surface has a Miller Index of 111. Accordingly, there is a need for a method to prevent or at least reduce whisker formation on tin or tin alloy coated substrates.

Detail Description Paragraph:

[0040] Bright deposits of tin or tin alloy may be obtained by adding brighteners to the tin or tin alloy baths. Such brighteners are well known in the art. Suitable brighteners include, but are not limited to, aromatic aldehydes such as naphthaldehyde, benzaldehyde, allylbenzaldehyde, methoxybenzaldehyde, chlorobenzaldehyde, derivatives of aromatic aldehydes, such as benzyl acetone, benzylidene acetone, aliphatic aldehydes, such as acetaldehyde or glutaraldehyde, and acids such as acrylic acid, methacrylic acid or picolinic acid. Such brighteners are used in amounts of from 0.1 to 3 g/L or from 0.5 to 2 g/L.

Detail Description Paragraph:

[0042] Tin and tin alloy baths may further include one or more alkylene oxide compounds. The one or more alkylene oxide compounds that are useful are any which yield deposits having good solderability, good matte or lustrous finish with satisfactory grain refinement, are stable in the acidic bath, electroplate at high speeds, are low foaming and proved a cloud point of the bath above 110.degree. F. (ca 43.degree. to 44.degree. C.). Suitable alkylene oxide compounds include, but are not limited to, ethylene oxide/propylene oxide (EO/PO) copolymers, alkylene oxide condensation products of an organic compound having at least one hydroxy group and 20 carbon atoms or less, and compounds prepared by adding oxypropylene to polyoxyethylene glycol. Typically, the EO/PO copolymers have an average molecular weight in the range of from 500 to 10,000 Daltons or from 1000 to 5000 Daltons. The EO/PO alkylene oxide copolymer is more typically employed to practice the present invention. One or more alkylene oxide compound may be employed in the tin or tin alloy baths. They are employed in amounts such as from 0.1 g/L to 15 g/L or such as 0.5 g/L to 10 g/L.

Detail Description Paragraph:

[0044] Additionally, the tin and tin alloy baths may include one or more

polyalkylene glycols. Suitable polyalkylene glycols are any which are compatible with the bath composition, yield deposits having good solderability, good matte or sheen finish with satisfactory grain refinement, are stable in an acidic electroplating bath, electroplate at high speed, are low foaming, and provide a cloud point of the bath above 110.degree. F. (ca. 43.degree. to 44.degree. C.). Suitable polyalkylene glycols include, but are not limited to, polyethylene glycol, and polypropylene glycol. Polyethylene glycol is more typically employed in the tin and tin alloy baths of the present invention. Such polyalkylene glycols are commercially available from a variety of sources and may be used without further purification.

Detail Description Paragraph:

[0070] The best results were achieved using copper plating baths 4 and 5. Both baths were within the scope of the present invention. Further, both baths 4 and 5 produced copper underlayers with copper crystal orientations of predominantly 220. The remaining copper plating baths showed significantly more whisker formation over the 8 week period. Such copper plating baths contained brightener components and were outside the scope of the present invention. Further, copper baths 1-3 did not produce copper underlayers having a copper crystal orientation of predominantly 220.

[Previous Doc](#)

[Next Doc](#)

[Go to Doc#](#)

Hit List

Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs
Generate OACS				

Search Results - Record(s) 1 through 10 of 51 returned.

☐ 1. Document ID: US 20050150770 A1

L5: Entry 1 of 51

File: PGPB

Jul 14, 2005

PGPUB-DOCUMENT-NUMBER: 20050150770

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050150770 A1

TITLE: Apparatus and method for electrolytically depositing copper on a semiconductor workpiece

PUBLICATION-DATE: July 14, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Chen, Linlin	Kalispell	MT	US	

US-CL-CURRENT: 205/123; 205/291

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	FWC	Draw D.
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☐ 2. Document ID: US 20050139478 A1

L5: Entry 2 of 51

File: PGPB

Jun 30, 2005

PGPUB-DOCUMENT-NUMBER: 20050139478

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050139478 A1

TITLE: Apparatus and method for electrolytically depositing copper on a semiconductor workpiece

PUBLICATION-DATE: June 30, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Chen, Linlin	Kalispell	MT	US	

US-CL-CURRENT: 205/104; 205/182, 205/291

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	FWC	Draw D.
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☐ 3. Document ID: US 20050092611 A1

L5: Entry 3 of 51

File: PGPB

May 5, 2005

PGPUB-DOCUMENT-NUMBER: 20050092611
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050092611 A1

TITLE: Bath and method for high rate copper deposition

PUBLICATION-DATE: May 5, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kim, Bioh	Kalispell	MT	US	
Gibbons, Kenneth W.	Kalispell	MT	US	

US-CL-CURRENT: 205/123; 106/1.13, 205/291

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	DOC	Draw D
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☐ 4. Document ID: US 20050082172 A1

L5: Entry 4 of 51

File: PGPB

Apr 21, 2005

PGPUB-DOCUMENT-NUMBER: 20050082172
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050082172 A1

TITLE: Copper replenishment for copper plating with insoluble anode

PUBLICATION-DATE: April 21, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kovarsky, Nicolay Y.	Sunnyvale	CA	US	
Lubomirsky, Dmitry	Cupertino	CA	US	
Hoermann, Alexander F.	San Jose	CA	US	
Singh, Saravjeet	Santa Clara	CA	US	

US-CL-CURRENT: 205/101

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	DOC	Draw D
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☐ 5. Document ID: US 20050058945 A1

L5: Entry 5 of 51

File: PGPB

Mar 17, 2005

PGPUB-DOCUMENT-NUMBER: 20050058945
PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050058945 A1

TITLE: Method of making a printed wiring board with conformally plated circuit traces

PUBLICATION-DATE: March 17, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fey, Edmond Otto	Vestal	NY	US	
Galasco, Raymond Thomas	Vestal	NY	US	
Miller, Thomas Richard	Endwell	NY	US	
Sargent, Anita	Endicott	NY	US	

US-CL-CURRENT: 430/311; 430/313, 430/315

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	DOC	Draw D
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☐ 6. Document ID: US 20050056537 A1

L5: Entry 6 of 51

File: PGPB

Mar 17, 2005

PGPUB-DOCUMENT-NUMBER: 20050056537

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050056537 A1

TITLE: Planarization of substrates using electrochemical mechanical polishing

PUBLICATION-DATE: March 17, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Chen, Liang-Yuh	Foster City	CA	US	
Hsu, Wei-Yung	Santa Clara	CA	US	
Duboust, Alain	Sunnyvale	CA	US	
Morad, Ratson	Palo Alto	CA	US	
Carl, Daniel A.	Pleasanton	CA	US	

US-CL-CURRENT: 204/229.4

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	DOC	Draw D
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☐ 7. Document ID: US 20050051433 A1

L5: Entry 7 of 51

File: PGPB

Mar 10, 2005

PGPUB-DOCUMENT-NUMBER: 20050051433

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050051433 A1

TITLE: Method and apparatus for monitoring, dosing and distribution of chemical solutions

PUBLICATION-DATE: March 10, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Zdunek, Alan D.	Chicago	IL	US	
Germouni, Omar	Chicago	IL	US	
Barajas, Alejandro A.	Clarendon Hills	IL	US	

US-CL-CURRENT: 205/82

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw D
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☐ 8. Document ID: US 20050045485 A1

L5: Entry 8 of 51

File: PGPB

Mar 3, 2005

PGPUB-DOCUMENT-NUMBER: 20050045485

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050045485 A1

TITLE: Method to improve copper electrochemical deposition

PUBLICATION-DATE: March 3, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Shih, Chien-Hsueh	Taipei		TW	
Ko, Ting-Chu	Taipei		TW	
Tsai, Minghsing	Taipei		TW	

US-CL-CURRENT: 205/123; 205/291

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw D
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☐ 9. Document ID: US 20050016858 A1

L5: Entry 9 of 51

File: PGPB

Jan 27, 2005

PGPUB-DOCUMENT-NUMBER: 20050016858

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050016858 A1

TITLE: Reverse pulse plating composition and method

PUBLICATION-DATE: January 27, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Barstad, Leon R.	Raynham	MA	US	
Buckley, Thomas	Rocky Hill	CT	US	
Cruz, Raymond	Waltham	MA	US	
Goodrich, Trevor	Windsor	MA	US	
Hamm, Gary	Medford	MA	US	
Kapeckas, Mark J.	Marlborough	MA	US	
Price, Katie	Stoneham	MA	US	
Reddington, Erik	Ashland	MA	US	
Sonnenberg, Wade	Edgartown	MA	US	

US-CL-CURRENT: 205/104

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	RMK	Drawings
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☐ 10. Document ID: US 20040256239 A1

L5: Entry 10 of 51

File: PGPB

Dec 23, 2004

PGPUB-DOCUMENT-NUMBER: 20040256239

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040256239 A1

TITLE: Tin plating method

PUBLICATION-DATE: December 23, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Whitlaw, Keith L.	Buxton	NY	GB	
Toben, Michael P.	Smithtown		US	
Egli, Andre	Richterswil		CH	
Crosby, Jeffrey N.	Nuneaton		GB	
Robinson, Craig S.	Coventry		GB	

US-CL-CURRENT: 205/118; 427/282

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	RMK	Drawings
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Clear

Generate Collection

Print

Fwd Refs

Bkwd Refs

Generate OACS

Terms

Documents

(electroplat?) and brightener

51

Display Format: CIT

Change Format

[Previous Page](#)

[Next Page](#)

[Go to Doc#](#)